GE Healthcare
Life Sciences

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Quality matters

Whatman™ filtration products for pharmaceutical quality control.

Quality matters

Why does quality matter?

Quality matters because you need to focus on conducting rigorous pharmaceutical quality control (QC) without worrying about the quality of the materials you use on a daily basis. That is why GE Healthcare Life Sciences is committed to supporting your pharmaceutical QC goals with high-quality Whatman filtration products that meet the highest standards—from beginning to the end of the manufacturing and QC process.

This brochure highlights the extensive range of GE Healthcare filtration solutions for pharmaceutical quality control offered under the Whatman brand. Whatman filter papers are world-renowned as a standard for laboratory filtration and are associated with quality, reliability, and customer service. Choosing Whatman filters means:

- A broad range of filtration options to meet any specific requirements you may have
- High reproducibility in order to allow for consistent performance
- Products manufactured to strict quality standards in ISO certified facilities

Intertek

Certificate of Registration

The following organization's Quality Management System has been assessed and registered by Intertek Certification AB as conforming to the requirements of:

ISO 9001:2008

The conditions and extent of this certificate are stated in the decision report

Certificate Number
45061

Initial Certification Date
19 June 2009

Certificate Issue Date
19 July 2012

Certificate Expiry Date
18 June 2015

GE Healthcare Life Sciences

Amersham (United Kingdom), other locations according to appendix

The Management System is applicable to:

Development, manufacture, sales, service and distribution of chemicals, devices and instruments for Life Sciences

SWEDAC ACCREDITERING
1639
ISO/IEC 17021

Magnus Molin, CEO
Intertek Certification AB
P.O Box 1103, S-164 22 Kista, Sweden

Fig 1: GE Healthcare has chosen ISO 9001: 2008 as the quality standard for our Quality Management System.

Complete range of innovative Whatman filtration products for pharmaceutical quality control

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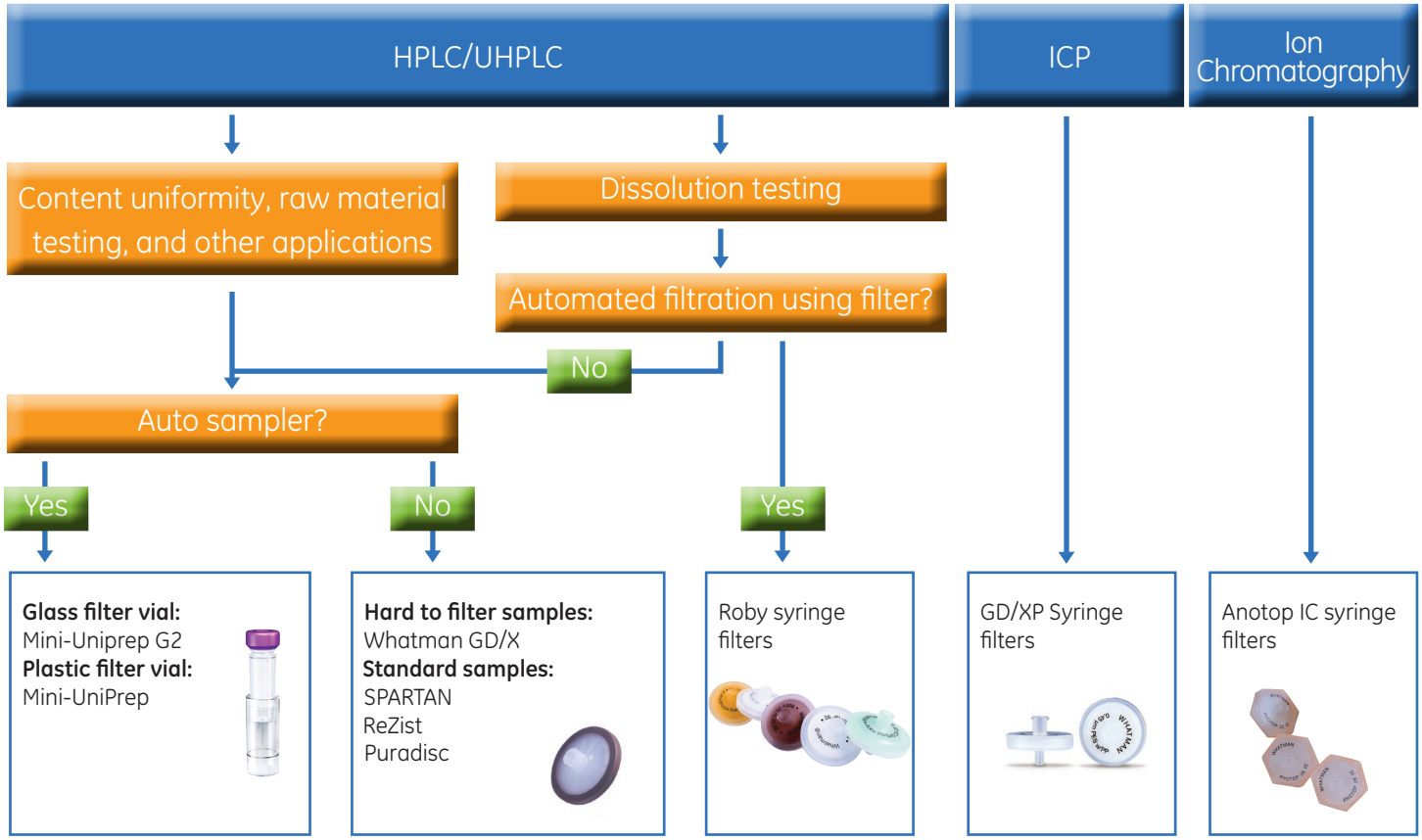
Analytical testing (including dissolution testing)

Syringe filters and filter vials selection tree according to analytical technique



Syringe filters overview

Syringe filter type	Without prefilter				With prefilter		For dissolution testing
Product	**Puradisc**	**SPARTAN**	**Anotop IC**	**ReZist**	**Whatman GD/X™**	**GD/XP**	**Roby**
Main feature	Complete range	Regenerated cellulose membrane HPLC certified	Each batch certified for IC	PTFE membrane (for aggressive solvents)	For hard to filter samples	For hard to filter samples with low inorganic ions levels	For automated systems
Pre-Filter	N/A	N/A	N/A	N/A	Multilayer glass fiber prefilter GMF150 10-1 µm GF/F 0.7 µm	Multilayer polypropylene prefilter (20-5 µm)	Glass fiber prefilter on select products
Diameter	4, 13, 25, or 30 mm	13 or 30 mm	10 or 25 mm	13 or 30 mm	13 or 25 mm	25 mm	25 mm
Main available pore sizes	0.1, 0.2, 0.45, 0.8, 1.0, 1.2, 5 µm	0.2 or 0.45 µm	0.2 µm	0.2 or 0.45 µm	0.2, 0.45, 0.7, 1.0, 1.2, 1.5, 2.7, 5.0 µm	0.45 µm	0.45 µm 0.7 µm 1.0 µm
Main membrane materials available	Cellulose acetate, Nylon, PES, PVDF, PP, PTFE	Regenerated cellulose	Aluminium oxide	PTFE	Cellulose acetate, Nylon, PES, PVDF, PP, PTFE, RC	Nylon, PES, PVDF, PP, PTFE	Nylon, cellulose acetate, regenerated cellulose, glass fiber GF55, glass fiber GF92

Mini-UniPrep filter vials for increased throughput

Whatman Mini-UniPrep Syringeless Filters provide a faster, easier way to remove particulates from samples being prepared for HPLC/UHPLC analysis. Syringeless filters simplify your workflow and reduce waste generated in the lab by replacing four different components with one Mini-UniPrep. Two versions are available: the Mini-UniPrep G2 with a glass vial and the original Mini-UniPrep polypropylene version.

Features:

- Consists of an integral borosilicate glass (G2 version) or polypropelene autosampler vial, plunger with attached filter membrane, and septum/cap
- Designed to be loaded directly into the autosampler
- Compatible with any autosampler that accommodates standard 12 mm x 32 mm profile vials (needle height of the autosampler may need adjusting)
- Versions available with slit septum
- Versions available with amber housing for light sensitive samples

Benefits:

- Replaces syringe, syringe filter, vial, and cap
- Time savings with multicompressors (6 or 8 positions)
- Waste and cost reduction
- Includes visual indication that the sample has been filtered
- Minimizes instrument downtime due to unfiltered samples

Fig 2: Mini-UniPrep glass (left) and plastic versions. Once compressed, the dimensions are equivalent in size to 12 mm x 32 mm vial.

Mini-UniPrep G2 Syringeless Filter with inner glass storage vial

- Consists of an integral borosilicate glass autosampler vial, plunger with attached filter membrane, and septum/cap
- Glass construction minimizes the risk of leachables contaminating the sample
- Use with hand-held manual compressor or multicompressor shown in figures 3 and 4

Mini-UniPrep Syringeless Filter Polypropylene housing

- Polypropylene housing
- Use with 6 position multicompressor

Fig 3: Left: Multi-unit compressor holding eight Mini-UniPrep G2 filters
Right: Single Mini-UniPrep G2 filter in a hand compressor. The compressors shown are for illustration purposes only and are not intended to represent the actual compressors. It is the buyer's responsibility to clarify with the seller the exact design of the compressors.

Fig 4: The multicompressor of the Mini-UniPrep polypropylene version holds 6 vials.

Ordering information - Mini-UniPrep with polypropylene housing

Pore size	Housing	Cap	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.	Quantity
	Membrane type		PTFE	PVDF	Nylon	PP	RC	PES	
0.2 µm	Translucent	Standard	UN203NPEORG	UN203NPEAQU	UN203NPENYL	UN203NPEPP	UN203NPERC	UN203NPEPES	100/pack
0.45 µm	Translucent	Standard	UN203NPUORG	UN203NPUAQU	UN203NPUNYL	UN203NPUPP	UN203NPURC	UN203NPUPES	100/pack
0.2 µm	Amber	Standard	UN203APEORG	UN203APEAQU	UN203APENYL	UN203APEPP		UN203APEPES	100/pack
0.45 µm	Amber	Standard	UN203APUORG	UN203APUAQU	UN203APUNYL	UN203APUPP		UN203APUPES	100/pack
0.2 µm	Translucent	Slit septum	US203NPEORG	US203NPEAQU	US203NPENYL	US203NPEPP		US203NPEPES	100/pack
0.45 µm	Translucent	Slit septum	US203NPUORG	US203NPUAQU	US203NPUNYL	US203NPUPP			100/pack

Ordering information - Mini-UniPrep G2 with inner glass storage vial

Pore size	Housing	Cap	Code no.	Code no.	Code no.	Code no.	Quantity
	Membrane type		PTFE	PVDF	Nylon	PP	
0.2 µm (HC)	Translucent	Standard	GN203NPEORGSP	GN203NPEAQUSP	GN203NPENYLSP	GN203NPEPPSP	100/pack + HC
0.2 µm	Translucent	Standard	GN203NPEORG	GN203NPEAQU		GN203NPEPP	100/pack
0.45 µm (HC)	Translucent	Standard	GN203NPUORGSP	GN203NPUAQUSP			100/pack + HC
0.45 µm	Translucent	Standard	GN203NPUORG	GN203NPUAQU			100/pack
0.2 µm (HC)	Amber	Standard	GN203APEORGSP	GN203APEAQUSP			100/pack + HC
0.2 µm (HC)	Translucent	Slit septum	GS203NPEORGSP				100/pack + HC
0.45 µm (HC)	Translucent	Slit septum	GS203NPUORGSP				100/pack + HC

HC = Includes one Hand Compressor

Ordering information - Mini-UniPrep Compressors

Compressors suitable for	Description	Code no.	Quantity
Mini-UniPrep G2 (glass vial)*	Hand Compressor - 1 position	MUPG2PWC1	1/pack
	Multi Compressor - 8 positions (includes 1 Tray)*	MUPG2MCPWC8	1/pack
	Multi Compressor Tray*	MUPG2MCWT8	1/pack
Mini-UniPrep (polypropylene vial)	Multi Compressor - 6 positions	CR0000006	1/pack

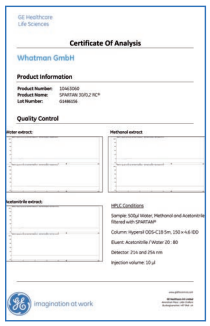
*Mini-UniPrep G2 multicompressor will be available during 2013.
Please contact your GE Healthcare representative for more information.

SPARTAN™ HPLC - certified syringe filters

SPARTAN is one of the most versatile syringe filters for the majority of HPLC samples. It includes regenerated cellulose (RC) membrane, which is both chemically resistant and free of interfering extractable.

Features and benefits:

- Versatile: Use for any application requiring a chemically resistant, hydrophilic, low protein-binding membrane
- Documented batch-to-batch quality delivers reproducible results
- Optional Mini-Tip outlet (13 mm diameter version) enables filtration into very small vials



Certificate Of Analysis

Whatman GmbH

Product Information

Product Number: 10463060
Product Name: SPARTAN 30/0.2 RC®
Lot Number: 0148026

Quality Control

Water extract:

Methanol extract:

Acetonitrile extract:

HPLC Conditions

Sample: 500µl Water, Methanol and Acetonitrile filtered with SPARTAN®

Column: Hypersil ODS-C18 5m, 150 x 4.6 ID0

Eluent: Acetonitrile / Water 20 : 80

Detector: 214 and 254 nm

Injection volume: 10 µl

imagination at work

Fig 5: SPARTAN syringe filters are tested and certified for the absence of UV-absorbing substances at wavelengths of 210 and 254 nm with water, methanol, and acetonitrile. Batch certificates can be downloaded from: www.gelifesciences.com/certificates

Ordering information - SPARTAN syringe filters

Membrane	Pore size	Code no.	Code no.	Code no.	Quantity
		13 mm diameter	13 mm diameter with mini-tip	30 mm diameter	
Regenerated cellulose	0.2 µm	10463100	10463040	10463060	100/pack
Regenerated cellulose	0.2 µm	10463102	10463042	10463062	500/pack
Regenerated cellulose	0.45 µm	10463110	10463030	10463050	100/pack
Regenerated cellulose	0.45 µm	10463112	10463032	10463052	500/pack

ReZist™ Syringe filters for aggressive organic solvents

Whatman ReZist filters are specifically designed to be resistant to organic solvents. ReZist 30 mm filters can also be used as venting filters for small vessels.

Features and benefits:

- Excellent chemical resistance against standard organic HPLC solvents
- 13 mm diameter with Mini-Tip outlet permits filtration into very small vials

Fig 6: 30 mm and 13 mm diameter ReZist syringe filters.

Ordering information – ReZist syringe filters

Membrane	Pore size	Code no.	Code no.	Quantity
		13 mm diameter with mini-tip	30 mm diameter	
PTFE	0.2 µm	10463703	10463503	100/pack
PTFE	0.2 µm		10463505	500/pack
PTFE	0.45 µm	10463713	10463513	100/pack
PTFE	0.45 µm		10463515	500/pack
GF 92 (glass)	> 1 µm		10463543	100/pack
GF 92 (glass)	> 1 µm		10463545	500/pack

Roby 25 Syringe filters for automated tablet dissolution testing

Roby 25 Syringe Filters were developed specifically for automated sample filtration in robotic systems.

Fig 7: Roby 25 syringe filters.

Features and benefits:

- Broad choice of membranes
- Optimized for Sotax™, Caliper™ (Zymark™), and Varian™ tablet testers
- Available with glass fiber prefilter for the filtration of difficult-to-filter samples
- Roby 25 Filter validation kit available (kit includes six types of filters: one tube of 25 filters of each type, for a total of 150 filters. Plus filter validation protocol with filter selection aid.)

Ordering information - Roby 25 mm syringe filters

Membrane/glass fiber filter	Pore size	Code no. 200/pack*	Code no. 1000/pack
Nylon**	0.45 µm	10463803	10463802
Nylon with GF92 prefilter	0.45 µm	10463805	10463804
Regenerated cellulose	0.45 µm	10463807	10463806
Regenerated cellulose with GF92 prefilter	0.45 µm	10463809	10463808
Cellulose acetate with GF92 prefilter**	0.45 µm	10463813	10463812
Glass fiber GF55	0.7 µm	10463814	10463815
Glass fiber GF92	1 µm	10463801	10463800

*8 tubes of 25 pieces each - **not included in the filter validation kit

Description	Code no.
Roby 25 Filter Validation Kit	10463898

In addition, GE Healthcare offers flat glass fiber filters that are widely used for dissolution testing in semi-automated systems.

Please refer to page 15 for more information on our glass fiber grades such as GF/F.

Puradisc Syringe filters for routine sample filtration

Puradisc Syringe filters combine quality and economy for filtration of samples up to 100 ml.

Fig 8: Puradisc syringe filters.

Features and benefits:

- Pigment-free polypropylene housing
- Standard inlet and outlet luer connectors
- Choice of filter sizes (4 mm to 30 mm) with optional Tube Tip)
- Choice of wide variety of membranes or glass microfiber filter media

Ordering information - Puradisc syringe filters, 25 mm*

Pore size	Code no.	Code no.	Code no.	Code no.	Code no.	Quantity
Membrane type	Nylon	PVDF	PTFE	PP	PES	
0.2 µm	6751-2502	6747-2502	6785-2502	6788-2502	6781-2502	200/pack
0.45 µm	6751-2504	6747-2504	6785-2504	6788-2504	6781-2504	200/pack
0.2 µm					6759-2502	300/pack
0.45 µm	6752-2504					500/pack
0.2 µm	6753-2502		6798-2502	6790-2502	6794-2502	1000/pack
0.45 µm	6753-2504	6749-2504	6798-2504	6790-2504	6794-2504	1000/pack

*please contact your GE Healthcare representative for other diameters and pore sizes.

Whatman GD/X™ and GD/XP Syringe filters for hard-to-filter samples

Whatman GD/X and GD/XP are high-quality disposable syringe filters that include prefilters for filtering larger sample volumes quickly. GD/X and GD/XP are excellent for filtering solutions that are heavily contaminated with particulates.

Features and benefits:

- **Increased volume throughput:** Volume of sample filtered can be three to seven times greater than conventional filters
- **Superior performance:** up to four layers of filtration media reduce blockage and the need to replace the filter in midoperation
- **Less hand force required:** The pre-filter layer allows high particulate samples to be filtered with less hand force, minimizing operator fatigue

Whatman GD/X syringe filters (suitable for HPLC and UHPLC analysis)

GD/X syringe filters contain four filtration layers which help reduce blockage and increase volume throughput.

- Integrated multilayer prefilter (10 µm to 0.7 µm)
- Prefilter made of glass microfiber
- Broad choice of final membrane types (0.2 µm or 0.45 µm)
- 13 mm or 25 mm diameters available

Whatman GD/XP Syringe filters (suitable for ICP sample analysis)

GD/XP syringe filters can be used with samples that require inorganic ion analysis (e.g., trace metal analysis).

- Integrated dual-layer prefilter stack (20 µm and 5 µm) and one final 0.45 µm membrane
- Prefilter made of polypropylene for minimization of ion leaches
- 25 mm diameter

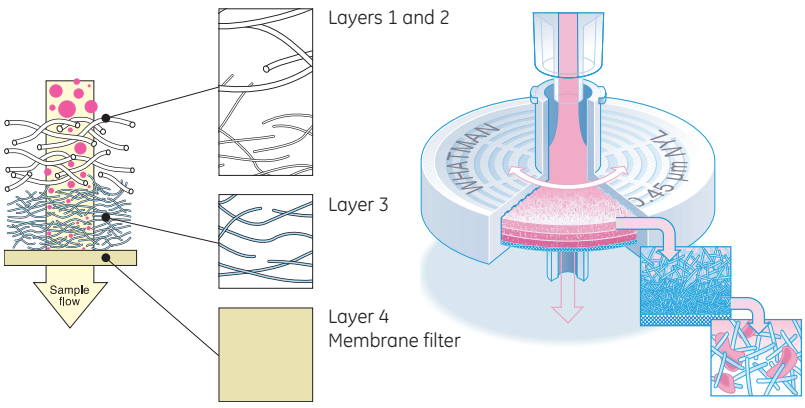


Fig 9: Whatman GD/X and GD/XP Syringe filters contain several filtration layers that substantially reduce blockage and increase volume throughput. This is a schematic representation of Whatman GD/X features only.

Fig 10: GD/X syringe filter.

Ordering information - GD/X and GD/XP syringe filters

Pore size	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.	Quantity
GD/X 25 mm with glass fiber prefilter								
Membrane type	Nylon	PVDF	PTFE	PP	PES	RC	CA	
0.2 µm	6870-2502	6872-2502	6874-2502	6878-2502	6876-2502	6887-2502	6880-2502	150 /pack
0.45 µm	6870-2504	6872-2504	6874-2504	6878-2504	6876-2504	6882-2504	6880-2504	150 /pack
0.2 µm	6871-2502	6873-2502	6875-2502		6905-2502			1500 /pack
0.45 µm	6871-2504	6873-2504	6875-2504	6879-2504	6905-2504	6883-2504	6881-2504	1500 /pack
GD/XP with polypropylene prefilter								
Membrane type	Nylon	PVDF	PTFE	PP	PES			
0.45 µm	6970-2504	6972-2504	6974-2504	6978-2504	6994-2504			150/pack
0.45 µm	6971-2504	6973-2504		6993-2504*	6995-2504			1500/pack

*DdPP- depth polypropylene

Anotop™ IC Syringe filters for ion chromatography (IC)

Whatman Anotop IC filters are for the preparation of samples for subsequent IC and HPLC analysis. These filters contain proprietary alumina-based Anopore™ membrane that enable very low levels of anion leaching during IC testing.

Fig 11: Anotop IC syringe filters.

Features and benefits:

- Very low levels of anion leaching (< 10 to 30 ppb for major anions)
- Pigment-free PP housing to eliminate sample contamination

Ordering information - Anotop IC Syringe filters

Membrane	Pore size	Quantity	Code no.
Anotop 10 IC (10 mm diameter)			
Aluminium oxide	0.2 µm	50/pack	6809-9232
Aluminium oxide	0.2 µm	100/pack	6809-9233
Aluminium oxide	0.2 µm	200/pack	6809-9234
Aluminium oxide	0.2 µm blister	250/pack	6809-9235
Anotop 25 IC (25 mm diameter)			
Aluminium oxide	0.2 µm	200/pack	6809-9244

Membrane filters for mobile phase filtration

GE Healthcare offers a wealth of experience and knowledge in the area of HPLC/UHPLC mobile phase preparatory membranes.

Features and benefits:

- A broad range of materials, pore sizes, and diameters
- Regenerated cellulose membranes (RC) are compatible with aqueous solvents and a vast majority of organic solvents

Fig 12: Whatman regenerated cellulose membranes—a good choice for mobile phase filtration (aqueous and organic).

Ordering information - Membrane filters (circles)

Membrane	Compatibility*	Pore size	Code no.	Code no.	Quantity
			47 mm diameter	50 mm diameter	
Nylon	Aqueous and organic solutions (3<pH<10)	0.2 µm	10414012	10414014	100/pack
		0.45 µm	10414112	10414114	100/pack
Regenerated cellulose	Aqueous and organic solutions	0.2 µm	10410312	10410314	100/pack
		0.45 µm	10410212	10410214	100/pack
PTFE	Organic solutions	0.2 µm	10411411	10411413	50/pack
		0.45 µm	10411311	10411313	50/pack

*Refer to table of Chemical Compatibility of Membranes on page 19.
Other membrane materials (such as polycarbonate, cellulose nitrate) with a wide variety of pore sizes, and diameters are available—please contact your GE Healthcare representative for more information.

Whatman GV050/2 vacuum filtration unit

Whatman GV050/2 vacuum filtration unit consists of a 250 ml glass filtration funnel and 1000 ml flask, funnel base, top, and clamp. This apparatus complements the Whatman filtration membranes range.

Ordering information - Vacuum filtration unit

Product	Code no.
GV050/2 vacuum filter holder 1/pack	10442200

Fig 13: GV050/2 vacuum filtration unit for membrane filtration.

General filtration

Cellulose filter papers

GE Healthcare offers an extensive line of cellulose filter papers. Whatman filters deliver high quality, reproducibility, and uniformity for quality control labs in the pharmaceutical industries.

Fig 14: Pre-pleated filter format.

Fig 15: Whatman flat filter paper (Grade 44).

Features and benefits:

- Wide choice of retention and flow rate combinations—retention down to 2.5 µm
- A variety of filters with different levels of purity, hardness, and chemical resistance
- Pre-pleated format available for some grades: they are suitable for hard-to-filter samples or to increase flow rate

Qualitative cellulose filter papers

Whatman qualitative cellulose filters are for qualitative analytical experiments to determine and identify specific materials.

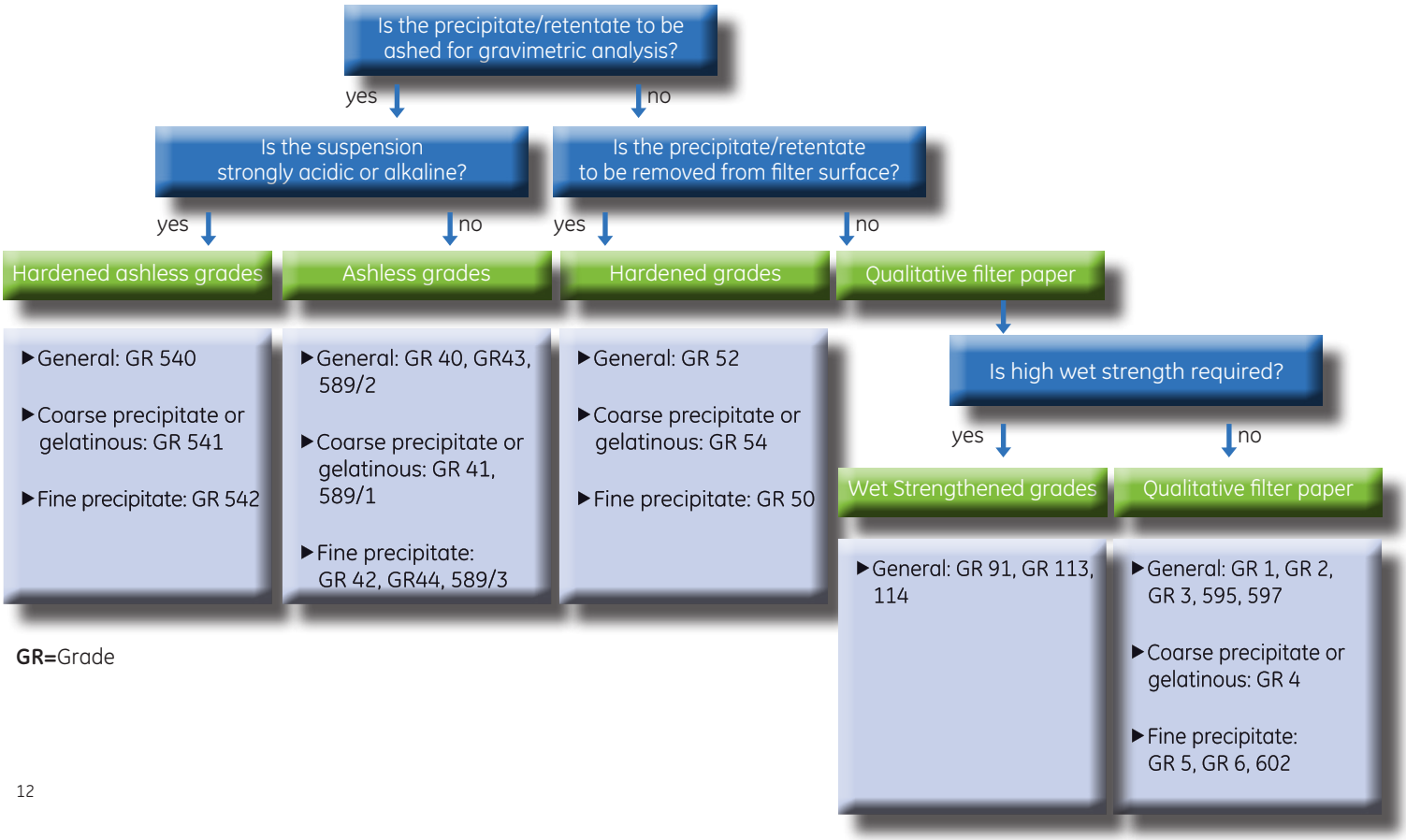
The two formats available are:
- Standard qualitative filters papers
- Wet strengthened filter papers

Quantitative cellulose filter papers

Whatman quantitative filters are for gravimetric analysis and the preparation of samples for instrumental analysis.

The three formats available are:
- Ashless quantitative filter papers
- Hardened low ash quantitative filter papers
- Hardened ashless quantitative filter papers

Use the decision tree to identify the filter paper that meets your needs



GR=Grade

Typical Properties of Whatman cellulose filter papers

Qualitative filter papers

Grade	Nominal particle retention in liquid (µm)	Filtration speed (approx) Herzberg (s)	Typical thickness (µm)	Basis weight (g/m²)	Grade for pre pleated version	Flow – aspect
Standard qualitative cellulose filter papers						
1	11	150	180	88		Medium
2	8	240	190	103	2V	Medium
3	6	325	390	187		Medium-thick
4	20-25	37	205	96		Very fast
5	2.5	1420	200	98	5V	Slow
6	3	715	180	105		Medium to slow
595	4-7	80	150	68	$595^{1/2}$	Medium to fast – thin
597	4-7	70	180	85	$597^{1/2}$	Medium to fast
602h	<2	375	160	84	$602h^{1/2}$	Slow
Qualitative wet strengthened cellulose filter papers						
113	30	28	420	125	113V	Fast – creped
114	25	38	190	77	114V	Fast – smooth
91	10	70	205	71		Creped
1573	<2	700	140	92	$1573^{1/2}$	Slow

Quantitative filter papers

Grade	Nominal particle retention in liquid (µm)	Filtration speed (approx)	Typical thickness (µm)	Basis weight (g/m²)	Ash content	Flow – aspect
Ashless quantitative cellulose filter papers						
40	8	340	210	95	0.007%	Medium
41	20	54	220	85		Fast
42	2.5	1870	200	100		Slow
43	16	155	220	95		Medium to fast
44	3	995	180	80		Slow to medium
589/1*	12-25	25	190	80	0.01%	Fast
589/2*	4-12	70	190	85		Medium to fast
589/3	<2	750	150	84		Slow
Hardened low ash quantitative cellulose filter papers						
50	2.7	2685	115	97	0.015%	Slow
52	7	235	175	101		Medium
54	22	39	185	92		Fast
Hardened ashless quantitative cellulose filter papers						
540	8	200	115	88	0.006%	Medium
541	22	34	175	82		Fast
542	2.7	2510	185	93		Slow

* Pre-pleated versions available

Maximum practical volumes of circle sizes (quadrant folded)

Volume (ml)	15	20	35	75	135	300
Filter Diameter (mm)	90	110	125	150	185	240

Ordering information – Qualitative filter papers - 100/pack

Diameter	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.
Qualitative	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 595	Grade 597	Grade 602H
42.5 mm	1001-042	1002-042		1004-042	1005-042	1006-042			
55 mm	1001-055	1002-055	1003-055	1004-055	1005-055			10311807	
70 mm	1001-070	1002-070	1003-070	1004-070	1005-070	1006-070		10311808	
90 mm	1001-090	1002-090	1003-090	1004-090	1005-090	1006-090		10311809	
110 mm	1001-110	1002-110	1003-110	1004-110	1005-110	1006-110	10311610	10311810	
125 mm	1001-125	1002-125	1003-125	1004-125	1005-125	1006-125	10311611	10311811	10312611
150 mm	1001-150	1002-150	1003-150	1004-150	1005-150	1006-150	10311612	10311812	10312612
185 mm	1001-185	1002-185	1003-185	1004-185	1005-185	1006-185		10311814	10312614
240 mm	1001-240	1002-240	1003-240	1004-240	1005-240	1006-240		10311820	10312620
Qualitative wet strengthened	Grade 91*	Grade 113	Grade 114	Grade 1573					
90 mm		1113-090	1114-090						
110 mm		1113-110							
125 mm		1113-125	1114-125						
150 mm	1091-150	1113-150	1114-150	10314712					
185 mm	1091-185	1113-185	1114-185	10314714					
240 mm	1091-240	1113-240	1114-240						
Qualitative pre-pleated	Grade 2V	Grade 113V	Grade 114V	Grade 595 1/2	Grade 597 1/2	Grade 602h 1/2	Grade 1573 1/2		
70 mm				10311641	10311841				
90 mm				10311642	10311842	10312642			
110 mm				10311643	10311843				
125 mm	1202-125	1213-125	1214-125	10311644	10311844	10312644	10314744		
150 mm	1202-150	1213-150	1214-150	10311645	10311845	10312645	10314745		
185 mm	1202-185	1213-185	1214-185	10311647	10311847	10312647	10314747		
240 mm	1202-240	1213-240	1214-240	10311651	10311851	10312651	10314751		

Ordering information – Quantitative filter papers 100/pack

Diameter	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.
Ashless	Grade 40	Grade 41	Grade 42	Grade 43	Grade 44	Grade 589/1	Grade 589/2	Grade 589/3
90 mm	1440-090	1441-090	1442-090	1443-090	1444-090	10300009	10300109	
110 mm	1440-110	1441-110	1442-110	1443-110	1444-110	10300010	10300110 10300143 (P)	10300210
125 mm	1440-125	1441-125	1442-125	1443-125	1444-125	10300011	10300111	10300211
150 mm	1440-150	1441-150	1442-150	1443-150	1444-150	10300012 10300045 (P)	10300112 10300145 (P)	10300212
185 mm	1440-185	1441-185	1442-185	1443-185	1444-185	10300014	10300114	10300214
240 mm	1440-240	1441-240	1442-240				10300120	
Hardened and Hardened ashless	Grade 50	Grade 52	Grade 54	Grade 540	Grade 541	Grade 542		
90 mm	1450-090	1452-090	1454-090	1540-090	1541-090	1542-090		
110 mm	1450-110	1452-110	1454-110	1540-110	1541-110	1542-110		
125 mm	1450-125	1452-125	1454-125	1540-125	1541-125	1542-125		
150 mm	1450-150	1452-150	1454-150	1540-150	1541-150	1542-150		
185 mm	1450-185		1454-185	1540-185	1541-185	1542-185		
240 mm	1450-240	1452-240	1454-240	1540-240	1541-240	1542-240		

*Grade 91: 1000 filters/pack - P = pre-pleated

Glass fiber filters

We provide Whatman binder free glass microfiber filters manufactured from 100% borosilicate glass for use in many applications such as general clarification, dissolution testing or prefiltration.

Features and benefits:

- Depth filters
- Fast flow rates
- High loading capacity
- Retention of very fine particles, extending into the sub-micron range

Fig 16: Whatman binder free glass fiber filters.

Typical properties of glass fiber filters

Product	Filtration speed	Particle retention in liquid (µm)	Typical thickness (µm)	Basic weight (g/m²)
Grade GF/A	Fast	1.6*	260	53
Grade GF/B	Medium to fast	1.0*	675	143
Grade GF/C™	Medium to fast	1.2*	260	53
Grade GF/D	Fast	2.7*	675	121
Grade GF/F	Medium	0.7*	420	75
GMF 150 1 µm - Multilayer	Medium to fast	1.2*	730	139

*Particle retention rating at 98% efficiency

Ordering information - Glass fiber filters - 100/pack

Diameters **	Code no.	Code no.	Code no.	Code no.	Code no.	Code no.
Glass fiber	Grade GF/A	Grade GF/B	Grade GF/C	Grade GF/D	Grade GF/F	Grade GMF 150 1 µm
25 mm	1820-025	1821-025	1822-025	1823-025	1825-025	
42.5 mm	1820-042	1821-042	1822-042	1823-042	1825-042	
47 mm	1820-047	1821-047	1822-047	1823-047	1825-047	1841-047
55 mm	1820-055	1821-055	1822-055	1823-055	1825-055	
70 mm	1820-070	1821-070	1822-070	1823-070	1825-070	
90 mm	1820-090	1821-090	1822-090	1823-090	1825-090	1841-090

**Other grades and dimensions are also available—please contact your GE Healthcare representative for more information

Autovial™ Syringeless filters

Autovial syringeless filters are preassembled filtration devices for removing particulates from samples. They replace syringes & syringe filters with a single, disposable device simplifying your filtration step.

Ordering information - Autovial syringeless filters - 5ml capacity

Pore size	Code no.	Code no.	Code no.	Code no.	Quantity
Membrane type	PTFE	PVDF	Nylon	GMF	
0.2 µm	AV115NPEORG				50/pack
0.45 µm	AV115NPUORG	AV115NPUAQU	AV115NPUNYL	AV115UGMF	50/pack

Fig 17: Autovial 5 syringeless filter.

Microbiological testing

Sterile membrane filters for microbiology

GE Healthcare provides a wide and versatile range of Whatman membrane filters for membrane filtration-based microbiology that consistently deliver high-quality performance.

- Cellulose mixed ester membranes—ME Standard type and ME 25 Select with improved recovery rate
- Cellulose nitrate membranes—MicroPlus type

These membranes are sterile, packed individually, and available in two formats:

- Standard format
- STL format for use with a membrane dispenser. They are compatible with most commercially available membrane dispensers, including GE Healthcare's membrane dispenser (see below)

Membranes are also available in black-plain and black-gridded formats.

Fig 18: STL membranes for use with a membrane dispenser.

Membrane dispenser saves time

Whatman membrane-butler: with each turn, a membrane filter is ejected from its sterile packaging and it can be removed easily with a pair of tweezers as shown in figure 19.

Description	Code no.	Quantity
Membrane Butler - Manual version	10477100	1/pack

Fig 19: Membrane-Butler membrane dispenser.

GE Healthcare also offers filtration manifolds and funnels for microbiology. Please contact your GE Healthcare representative.

Ordering information - sterile membrane filters

Membrane type	Material	Pore size	For membrane dispenser?	Code no.	Code no.	Quantity
				Diam 47 mm	Diam 50 mm	
ME type	Cellulose mixed ester	0.2 µm	No	10406970	10406972	100/pack
		0.2 µm	Yes	10408712	10408714	400/pack
		0.45 µm	No	10406870	10406872	100/pack
		0.45 µm	Yes	10407312	10407314	400/pack
ME25 Select	Cellulose mixed ester (improved recovery)	0.45 µm	No	10406800	10406801	100/pack
		0.45 µm	Yes	10406803	10406802	400/pack
Microplus	Cellulose nitrate	0.45 µm	No	10407713	10407714	100/pack
		0.45 µm	Yes	10407112	10407114	400/pack

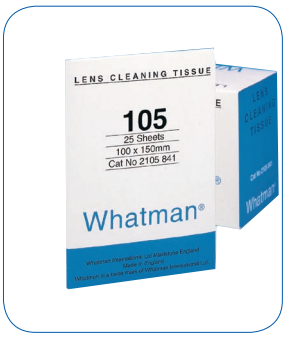
The membranes listed above are white with a black grid—other membrane colors and pore sizes are available. Please contact your local GE Healthcare representative.

More than filtration

Essential laboratory accessories

In addition to the filtration consumable range, we provide a comprehensive range of accessories for routine work in your laboratory. The table below shows a selection of the products we offer.

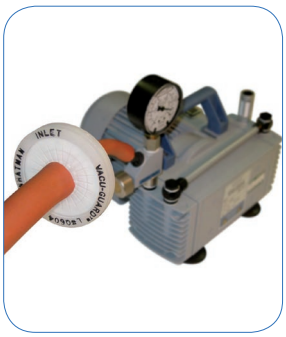
1PS phase separator



Grade 105 lens cleaning tissue

Benchkote™ protection paper

pH papers



Vacu-Guard Pump protection filter

Description	Product name	Dimension	Code no.	Qty/pack
Phase separation paper •Automatic cut-off: Separatory Funnel Replacement •Ease of use: No special training required	1PS Phase separator paper	Diam. 125 mm	2200-125	100
		Diam. 150 mm	2200-150	100
Optical lens cleaning tissue •For removal surface moisture and grease from lenses and other optical surfaces which can be easily scratched if you do not clean them with a very soft surface	Grade 105	100 × 150 mm	2105-841	25 wallets of 25 sheets
		200 × 300 mm	2105-862	100
Benchkote bench protection papers •High-quality, smooth, absorbent Whatman paper •Quickly absorbs liquid spills and protects the working surface •Benchkote Plus is thicker and more absorbent	Benchkote	460 x 570 mm	2300-916	50
		460 mm x 50 m	2300-731	1 reel
	Benchkote Plus	500 x 600 mm	2301-6150	50
		600 mm x 50 m	2301-6160	1 reel
Weighing papers •Designed for weighing and transferring samples safely and reliably •Minimized influence on analytical results	Grade 2122	100 x 100 mm	10347893	500
	Grade B-2 Sheets	3 x 3 inch	10347671	500
Antibiotic assay papers •For determining the type of causal agent of infectious diseases and checking their sensitivity to antibiotics and chemotherapeutic agents in vitro based on the inhibition zone determination method	Antibiotic Assay Discs	6 mm	2017-006	1000
pH Indicator Papers •Range of pH indicator and test papers for the rapid determination of pH values in many applications	Colour Bonded, 0.0 to 14.0 range	6 x 80 mm	2613-991	100 strips
	Standard Full Range, Reel, 1.0 to 14.0 range	7 mm x 5 m	2600-100A	1
	Standard Narrow Range, Reel, 4.0 to 7.0 range	7 mm x 5 m	2600-102A	1
Pump protection filters •Protects vacuum pump systems from aqueous aerosols. Hydyrophobic PTFE membranes retain 99.99% or airbone particles > 0.1 µm	Vacu-Guard	50 mm	6722-5000	10

For more product information, please contact your GE Healthcare representative and technical support.

Discover GE Healthcare Pharmacopeia-compatible spectrophotometers

Ultrospec spectrophotometers are dual-beam UV Visible spectrophotometers for use in high specification laboratories. Variable bandwidth capability and custom calculation facilities support method development.

- 1 nm or variable bandwidth supports European Pharmacopeia compatibility
- 21 CFR part 11 support through Datrys CFR software (optional)
- High-performance dual-beam wavelength range 190 to1100 nm

Contact your GE Healthcare representative to get more information on our range of spectrophotometers or visit www.gelifesciences.com/spectros

Fig 20: Ultrospec 9000 stand-alone instrument.

Ask us about bioprocessing and research solutions

In addition to the range of products suitable for quality control laboratories, we provide expertise and tools for a wide range of applications, including basic research, drug discovery research, and tools to support large-scale manufacturing of biopharmaceuticals.
This includes:

- Bioprocessing solutions for upstream and downstream operations including process-scale filtration applications
- Protein and cell analyses products that support drug discovery from target identification to lead optimization and predictive toxicity testing
- Investigational protein and cell analyses to understand the cause(s) of diseases
- Nucleic acid research tools
- Preparative protein purification and research tools
- Cell bioprocessing for cell therapy (i.e., the separation, isolation, and expansion of cells)

BioProcess™ filters and systems support process-scale filtration applications, including clarification, sterile filtration and UF/DF operations.

GE Healthcare protein and cell analysis equipment provide deep insights and early predictions of lead efficacy and safety.

Chemical compatibility of membranes and housings

Solvent	ANP	CA	CN	PC	PE	GMF	NYL	PP	DpPP	PES	PTFE**	PVDF	RC
Acetic Acid, 5%	R	LR	R	R		R	R	R	R	R	R	R	R
Acetic Acid, Glacial	R	NR	NR			R	LR	R	R	R	R	R	NR
Acetone	R	NR	NR	NR	R	R	R	R	R	NR	R	NR	R
Acetonitrile	R	NR	NR			R	R	R	R	NR	R	R	R
Ammonia, 6N	NR		NR	NR	LR	LR	R	R	R	R	R	LR	LR
Amyl Acetate	LR	NR	NR	NR	R	R	R	R	R	LR	R	LR	R
Amyl Alcohol	R	LR	LR			R	R	R	R	NR	R	R	R
Benzyl Alcohol*	R	LR	LR	LR	R	R	LR	R	R	NR	R	R	R
Butyl Alcohol	R	R	R	R	R	R	R	R	R	R	R	R	R
Butyl Chloride*						R	NR	NR	NR		R	R	
Carbon Tetrachloride*	R	NR	R	LR	R	R	LR	NR	NR	NR	R	R	R
Chloroform*	R	NR	R	NR	R	R	NR	LR	LR	NR	R	R	R
Chlorobenzene*	R		LR	NR		R	NR	LR		NR	R	R	R
Citric Acid						R	LR	R		R	R	R	R
Cyclohexanone	R	NR	NR			R	NR	R	R	NR	R	R	R
Cyclohexane*	R	NR	NR	R	R	R	NR	NR	NR	NR	R	R	R
Diethyl Acetamide		NR	NR			R	R	R	R		R	NR	R
Dimethyl Formamide	LR	NR	NR			R	R	R	R	NR	R	NR	LR
Dioxane	R	NR	NR	NR	R	R	R	R	R	LR	R	LR	R
DMSO	LR	NR	NR	NR	R	R	R	R	R	NR	R	LR	LR
Ethanol	R	R	NR	R	R	R	R	R	R	R	R	R	R
Ethers*	R	LR	LR	R	R	R	R	NR	NR	R	R	LR	R
Ethyl Acetate	R	NR	NR	NR	R	R	R	R	R	NR	R	NR	R
Ethylene Glycol	R	LR	LR	R	R	R	R	R	R	R	R	R	R
Formaldehyde*	LR	LR	R	R	R	R	R	LR	LR	R	R	R	LR
Hexane	R	R	R	R	R	R	R	R	R	R	R	R	R
Hydrochloric Acid, Conc*	NR	NR	NR	NR	NR	R	NR	LR	LR	R	R	R	NR
Isobutyl Alcohol	R	LR	LR	R	R	R	R	R	R		R	R	R
Isopropyl Alcohol	R	R	LR			R	R	R	R		R	R	R
Methanol	R	R	NR	R	R	R	R	R	R	R	R	R	R
Methyl Ethyl Ketone	R	LR	NR	NR	R	R	R	R	R	NR	R	NR	R
Methylene Chloride*	R	NR	LR			R	NR	LR	LR	NR	R	R	R
Nitric Acid, Conc*		NR	NR	LR	NR	R	NR	NR	NR	NR	R	R	NR
Nitric Acid, 6N*		LR	LR			R	NR	LR	LR	LR	R	R	LR
Nitrobenzene*	LR	NR	NR	NR	R	R	LR	R	R	NR	R	R	R
Pentane*	R	R	R	R	R	R	R	NR	NR	R	R	R	R
Phenol 0.5%	LR	LR	R			R	NR	R	R	NR	R	R	R
Pyridine	R	NR	NR	NR	R	R	LR	R	R	NR	R	NR	R
Sodium Hydroxide, 6N	NR	NR	NR	NR	NR	NR	LR	R	R	R	R	NR	NR
Sulfuric Acid, Conc*	NR	NR	NR	NR	NR	R	NR	NR	NR	NR	R	NR	NR
Tetrahydrofuran*	R	NR	NR			R	R	LR	LR	NR	R	R	R
Toluene*	R	LR	R	NR	R	R	LR	LR	LR	NR	R	R	R
Trichloroethane*	R	NR	LR	NR	R	R	LR	LR	LR	NR	R	R	R
Trichloroethylene*	R		R			R	NR	LR	LR	NR	R	R	R
Water	R	R	R	R	R	R	R	R	R	R	R	R	R

R = Resistant; LR = Limited Resistance; NR = Not Recommended; * = Short Term Resistance of Housing
The above data is to be used as a guide only. Testing prior to application is recommended.
** = membrane may need pre-wetting with isopropanol/methanol if filtering a polar liquid

ANP = Anopore; CA = Cellulose Acetate; CN = Cellulose Nitrate; DpPP = Polypropylene Depth Filter; GMF = Glass Microfiber; NYL = Nylon; PC = Polycarbonate; PE = Polyester; PES = Polyethersulfone; PP = Polypropylene; PTFE =Polytetrafluoroethylene; PVDF = Polyvinylidene Difluoride; RC= Regenerated Cellulose

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